

DOCKET NO: 281773US0X PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :  
KENICHI ISHIKAWA, ET AL. : EXAMINER: DANIEL MILLER  
SERIAL NO: 10/560,526 :  
FILED: DECEMBER 13, 2005 : GROUP ART UNIT: 1794  
FOR: ACTIVATED CARBON PRODUCT :  
IN SHEET FORM AND ELEMENT OF  
DEVICE FOR PREVENTING  
TRANSPIRATION OF FUEL VAPOR

DECLARATION UNDER 37 C.F.R. § 1.132

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

I, Kenichi ISHIKAWA, state:

1. That I am a citizen of Japan, residing at 3-11-10, Shiraniwadai, Ikoma, Nara, Japan.
2. That I am a co-inventor in the above -identified application.
3. That I graduated from a Master Course in Physics, Kyusyu University in March, 1991.
4. That I joined Kuraray Co., Ltd. in April, 1991, and have been engaged in the development of activated carbon.
5. The following experiments were performed by me or under my supervision.
6. I have read and understood Brownhill et al. (U.S.P. 4,289,513).

7. The Brownhill et al. sorbition paper is produced by employing a latex type binder material such as polyvinyl chloride copolymer, acrylics (see their claims, lines 36 to 40 on column 7).

8. Our invention is directed to an element comprising a honeycomb-shaped activated carbon paper by paper-making a composition comprising a binder and activated carbon (i) satisfying  $b/a = 0.3$  through 0.55 and (ii) adsorbing and desorbing gasoline vapor, wherein (iii) the binder comprises pulp and at least one polyvinyl alcohol (PVA)-based binder fiber providing fire retardancy (Claim 1).

9. The following experiments demonstrate that the activated carbon paper produced by paper-making according to the present invention is superior to the activated carbon paper produced by employing a latex type binder.

10. The following experiments were performed by me or under my supervision.

11. Reference Example:

1 kg of a raw material obtained by crushing and sieving coconut shell charcoal into 8 through 16 meshes was put in a batch-wise rotary kiln with a capacity of 10 liters, raised in temperature to 900°C while flowing a slight amount of nitrogen gas, and then activated by introducing carbon dioxide gas at 5 liters/min as an activation gas.

After 12 hours, the introduction of carbon dioxide gas was stopped, and the material was cooled and taken out. The benzene adsorption capacity of the activated material was measured as 57.1%. The activated carbon obtained was crushed by a ball mill to a central grain diameter of 50 micrometers.

12. Experiment 1:

The activated carbon obtained by Reference Example was mixed with pulp and the polyvinyl alcohol (PVA)-based binder KURALON VBP107-1 made by KURARAY CO., LTD., and for improvement in fire retardancy, a PVA-based binder KURALON VPX203

made by KURARAY CO., LTD. at the weight percentages of activated carbon/pulp/VPB/VPX=60/20/10/10. To 100 parts by weight of the obtained mixture, 4000 parts by weight of water was added and mixed. The obtained slurry material was paper-made into an activated carbon paper molding. The molding was molded into a corrugated shape, whereby a corrugated honeycomb molding with a cell density of 120 cpsi was obtained.

13. Experiment 2:

The Experiment 1 was performed in the same manner as Experiment 1 except that a latex was used in place of VPX.

14. Experiment 3:

The Experiment 1 was performed in the same manner as in Experiment 1 except that a latex was used as a binder and activated carbon/latex=60/40 in terms of weight percentages. To 100 parts by weight of the obtained mixture, 4000 parts by weight of water was added and mixed. But, it was impossible to obtain an activated carbon paper from this slurry material by paper-making.

15. Experiment 4:

The corrugated honeycomb molding obtained by Experiment 1 and 2 was cut into a 100mm square with a length of 10mm, horizontally attached to a container with an internal size of 100mm square and a length of 300mm so as not to create gaps on its periphery, 5 percent by volume of n-butane was flown upward at 100 milliliter/min, and the n-butane concentration on the outlet side was measured. From the adsorption time until the inlet side concentration reached 10 percent, an n-butane adsorbing amount was calculated. The results are shown in Table 1.

16. The activated carbon paper obtained in Experiment 2 was inferior to Experiment 1 in n-butane adsorbing amount due to presumably clogging pores on a surface of

FEB. 11. 2009 3:19PM OBLON SPIVAK  
Application Serial No. 10/560,320  
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the activated carbon by a latex. The activated carbon paper obtained in Example 1 was superior to Experiment 2 in fire-retardancy.

Table 1

	n-butane adsorbing amount (g)
Experiment 1	0.135
Experiment 2	0.090

17. The undersigned declare further that all statements made herein are of his own knowledge are true and that all statements made on information are believed to be true. Further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

Feb. 6, 2009  
Date: February 6, 2009

K. Ishikawa  
Kenichi ISHIKAWA